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Filing Date	October 15, 2001
First Named Inventor	Robert D. Herpst
Art Unit	1797
Examiner Name	Lyle Alexander
Attorney Docket Number	

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
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Remarks

Reply Brief

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Roger M. Rathbun		
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Date	February 2, 2009	Reg. No.	24,964

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02-03-09 IFW AF

(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Robert D. Herpst

Application No.: 09/977,664 Art Unit: 1797

Filed: October 15, 2001 Examiner: Lyle Alexander

For: A SAMPLE HOLDING SUBSTRATE FOR USE WITH AN INFRARED SPECTROPHOTOMETER OR FILTROMETER AND METHODS OF MANUFACTURE AND USE THEREOF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY BRIEF

The present Reply Brief is being submitted in response to the Examiner's Answer mailed December 5, 2008 in order to counter arguments raised by the Examiner. Appellant is filing this Reply Brief within the time period for response, and therefore, no fees are believed to be due.

REPLY ARGUMENTS

APPELLANT DOES NOT CONCEDE THAT THE PRIOR ART INCLUDED THE USE OF UNPOLISHED BLANKS FOR SPECTROSCOPIC ANALYSIS.

In the Answer Brief of the Examiner, he has reiterated a recurring theme of the various Office Actions during the prosecution of the present application by taking a sentence from the present specification out of context to make the argument that

unpolished blanks were, without further processing, used as sample supporting windows in the field of spectroscopy. That contention is categorically denied by Appellant and is contrary to the evidence introduced into this application and the plain statements of Appellant's experts.

The Examiner has cited Appellant's specification page 5, second paragraph, as showing that the Appellant admits that it is known in the art to use both polished crystals and unpolished crystal blanks to perform a qualitative IR analysis and that it would be within the skill of the art to modify Gagnon et al in view of "Applicant's Admitted Prior Art" or Izumi and not polish the crystal to minimize the cost of production. Appellant submits that since the level of energy transmission through an optic that is necessary for analysis by IR spectroscopy can only be achieved by sufficient polishing of a blank optical window to overcome its opacity, no one having that information jumped to the conclusion that it was even possible to use a crystal blank in unpolished form. In fact, both of Appellant's experts consider the use of unpolished crystals as described in Appellants claims to achieve an "unexpected result".

On page 5, line 17 et seq, it is stated that "As can be seen in Figs. 3A, 3B, 4A, 4B, 5A and 5B, the transmission of these materials is enhanced immeasurably by water polishing." The process for polishing the blanks for use in spectroscopy is then described in the specification. The very Figures referenced above (see Fig. 3A, 3B, 4A, 4B, 5A and 5B) show the low level of transmission of an unpolished blank and the much higher transmission of crystal windows that have been polished to the level of transmissivity necessary to obtain quality results with IR spectroscopy

Further, page 6, beginning at line 11, states that "The number of samples that can be scanned on a water polished crystal blank far exceeds the single sample scan that is taken with a disposable sample card made with mesh or polymer windows, because it is possible to repolish crystal blanks. Spectroscopists have repolished crystal windows for years, however, many labs now consider the labor cost of repolishing a crystal blank to be too high to justify the effort." As such, the polished crystal blanks not only need the water polishing but for further samples, there is a need to repolish the

crystal with considerable cost, all of which is avoided with the disposable substrates of the present invention.

Note page 7, line 1, "Unless the opacity is overcome by a fine polish using smaller size grinding compounds or by a water polish (as discussed earlier), the opacity of the optic dramatically limits the ability of the optic to transmit light energy (including the infrared energy used in an IR or FTIR spectrophotometer)" and "This multi-step process is labor intensive and is expensive, which is one of the reason that crystal blanks are more expansive sample supporting windows than polymers or screens and mesh."

The same point is explicitly made by the declarations of the experts in this field submitted by Appellant.

For example, Dr. de Haseth unequivocally stated that "Blanks, which were sold in unpolished form were unsuitable for spectroscopic analysis unless and until they were polished. It was also common for practicing spectroscopists to know how to polish alkali halide windows. This is a time consuming process and it is a skill that has almost been totally lost to the average spectroscopy lab." See de Haseth Declaration III, paragraph 2(a).

Dr. Smolyarenko, in a similar manner stated "In the field of optics, and optical materials, it is well known that optics have been precision processed for virtually every application in which they have been used as component of an optical product or optical device, including those optical devices used in spectroscopy for sample analysis". Smolyarenko Declaration I, paragraph 8)

Even the Izumi reference cited by the Examiner states that the known state of the art for processing crystal material, such as KBr, is to carry out laborious polishing steps that are, by their very nature, expensive to carry out.

Again, the only reference in the present specification is that quoted by the Examiner and the text clearly continues on so as to describe the necessity to polish the blank. The spectra shown in Figs. 3A, 3B, 4A, 4B, 5A and 5B demonstrate that an

unpolished crystal blank has very little transmission as compared to water polished crystal blank, and, as shown in Figs. 8, 9 & 10, cleaved crystals have transmission comparable to water polished crystal blanks.

Accordingly, the present specification, the declaration of Dr. de Haseth and the declaration of Dr. Smolarenko all clearly describe the state of the prior art to the effect that blanks without polishing were simply not used and that the polishing steps were necessary to bring the opacity into the range to needed to carry out the spectroscopic analysis.

In fact, the common knowledge of the need for polishing the blanks was so ingrained in the prior art, it led both of Appellant's renown experts in their Declarations to conclude that the fact that the present crystals can be used without any type of polishing brought about an unexpected result over the polished blanks.

Dr. de Haseth stated "It is my opinion that it would be unexpected for one skilled in the art of spectroscopy to be able to construct a finished product in the form of a sample holder for an infrared spectrophotometer or infrared filtometer in accordance with the steps and recited features of that claim and that familiarity with the previously discussed prior art relating to sampling substrates made of polymers, screens and crystal blanks (whether polished or unpolished) would not lead one skilled in the art to produce a usable substrate for a sample card in accordance with the recited features of that claim". (De Haseth Declaration III, paragraph 6)

Dr. Smolyarenko stated:

"Use in a spectroscopic sample device of an optic formed merely by cleaving fly cutting, chipping, milling or scaling is therefore an unexpected result to those skilled in the art because cleaving, fly cutting, chipping, milling or scaling creates an optic which has not been processed as a blank and has not been precision optically polished yet the optic transmits sufficient light or energy for spectroscopic applications." (Smolyarenko Declaration II, paragraph 8)

Dr Smolyarenko further stated:

"Use in a spectroscopic sampling device of an optic formed merely by cleaving, fly cutting, chipping, milling, sawing or scaling without [being] precision optically polished is therefore an unexpected result to those skilled in the art". (Smolyarenko Declaration I, paragraph 8)

Dr. Smolyarenko's supplemental Declaration expanded on the factual basis for his opinion when he stated:

"In the field of optics and optical materials, it is well known that optics have been precision processed for virtually every application in which they have been used as components of an optical product or optical device, including those optical devices used in spectroscopy for sample analysis. In its crudest form, precision processing comprises grinding an optical material to make the surfaces flat and parallel to form what is known in the industry as a "blank". An optical blank is opaque and cannot be used in an optical device until the opaque surfaces are made transmissive to energy or light by polishing means. The grinding operation to form a blank is normally done on precision optical equipment such as a planetary lapping machine. Precision polishing of an optic comprises grinding the light transmitting surfaces of an optical material with successively smaller particles of grinding or polishing compounds such as Garnet or Aluminum Oxide until the optic becomes sufficiently transmissive to light or energy for the application for which it is intended." (Smolyarenko Declaration II, paragraph 8)

Dr. de Haseth's supplemental Declaration states the status of the prior art use of "blanks"

"Unpolished opaque alkali halide window, known as "blanks" were available to spectroscopists at a cost that was considerably lower than the cost of highly polished windows. Blanks, which were sold in unpolished form, were unsuitable for spectroscopic analysis unless and until they were polished. It was also common for practicing spectroscopists to know how to polish alkali halide windows. This is a time consuming process and it is a skill that has been almost totally lost to the average spectroscopy lab."

With the dominance of rapid data collection FT-IR spectrophotometers sample preparation became a rate limiting step in spectral measurement. By the 1980's data collection time had become shorter than sample preparation time and spectroscopists, or their lab managers, began to look for ways to reduce preparation and increase efficiency. As unpolished blank alkali halide windows were no longer being polished in

the laboratory, the cost of analysis with these windows started to become prohibitively expensive as they had to be purchased from optics vendors in highly polished form at a considerable premium to the price of a "blank". Alternatives to alkali halide windows were sought." See de Haseth Declaration III, paragraphs 2(a) and 2(b).

The specification is clear as are the declarations of two well qualified experts that the use of the present crystal substrates as described in the claims is an unexpected result and provides a disposable substrate having the desired optical properties without the need for expensive and laborious polishing of the substrate.

CONCLUSION

Appellant submits that claims 1-2, 10-11, 15-20, 28, 30-31, 33, 35-37 and 39-53 are both novel and unobvious over the references cited in the present application and respectfully request that the Board reverse the rejection of claims 1-2, 10-11, 15-20, 28, 30-31, 33, 35-37 and 39-53 for the reasons set forth above.

Dated: 2/2/2009

Respectfully submitted,

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